REMARKS

Remarks concerning to the preceding amendments for the detailed Office action are presented.

Specification (Items 1-2 of detailed action)

Item 1. The abstract of the disclosure is objected to because the heading "Abstract" is misspelled, and "convertion" should be changed to "conversion" (Line 6). Collection is required.

Item 2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The "abstract" is amended as the amendments including the corrections of misspelling.

Drawings (Item 3 of the detailed action)

Item 3. The drawings are objected to because the names of the parts are not included in Fig. 6. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawing of "Fig.6" is amended as the "Fig.6" of amendments.

Claim objections (Items 4-5 of the detailed action)

Item 4. Claim 1 is objected to because of the following informalities: "uniform density pixel" should be changed to "uniform pixel density". Appropriate correction is required.

Clime 1 is corrected to "uniform pixel density". (changed to claim 7)

Item 5. Claims 5-6 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim 4 and claim 5 is corrected to claim 12 and claim 13 respectively to avoid depending from other multiple dependent claims.

Claim Rejections - 35 USC 102 (Items 6-7 of the detailed action)

Item 6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action. ---

Item 7. Claims 1-4 are rejected under 35 U.S.C. 102 (b) as being anticipated by Hoagland (5309241).

At first, before remarks of each claim, explains distinctive points of the present invention comparing to Hoagland.

The present invention realizes the electronic zooming using the fixed focus optical system that does not use conventional variable focus zoom lens.

The most important features of the present invention is to apply the fixed focus compressing optical system having a function of compressing the circumferential part of the input image that realizes to compress non-linearly (P4,L7-8) such as in logarithmic function (P13,L2-6) compressing the input image more largely as it moves to the circumferential part (P7,L29-30) to make compressed zoom input image.

That is, the compression of the circumferential part of the input image means necessarily non-linear compression.

From this compressed zoom input image, every zoom output images of wide or telephoto angles can be freely attained electronically through image data processing.

This compression of the present invention realized the output zoom image to reduce image data for wider-angle images comparing to narrower angle images, without degrading image resolution.

Hoagland, on the other hand, aims to alter the aspect ratio to conform to the image sensor by using anamorphic fiber optic taper optical system. But the change of the aspect ratio by the anamorphic fiber optic taper is simply to expand or compress the height or width of the image linearly. (At least non-linearity is not needed.)

And the anamorphic fiber optic taper don't have any function of compressing circumferential part of the input image non-linearly that is essential for the present invention to realize the electronic zooming function.

This difference of linear/non-linear compression of the image can be apparently comprehended by comparing figures of hoagland's FIG.3 to Fig.1 of the present invention.

Followings are explanations of the difference from Hoagland for each claim items.

Claim 1 (amended to claim 7) Hoagland discloses a zoom image input method that enables zooming without degrading the resolution by including a fixed focus input image optical system (106) having a function of compressing the conventional part of input image, the image input device providing preferably uniform pixel density, and image converting and correcting system (Col3, Lines41-58, 66-68; Col5, Lines56-68; Col6, Lines1-32)

But, the functions or descriptions of this invention cannot find in Hoagland's disclosure, and cannot be anticipated by it.

About the input image optical system

Actually, Hoagland's optical system (106) does not include any functions or descriptions of a fixed focus input image optical system having a function of compressing the circumferential part of the input image. The optical system 106 that compresses the image scene proportionally (C5,L62-66), and do not have a function of compressing the circumferential part of the input image that realizes the non-linear image compression as explained previously. Hoagland's disclosure has the function of changing dimensions of the scene image on the input face (C2,L65-68), and does not at all require such a non-linear compressing function of the present invention that compresses the circumferential part of the input image.

It is also clearly described in the present invention that the CinemaScope as the representative example of the anamorphic optical systems that is simply compressed and enlarged in proportional (in linear) is different from the present invention that realizes the zoom function through the data processing with non-linear image compression. (P9, L 25-31)

About the electronic zoom function

And also, Hoagland's disclosure does not show any function of a zoom image input method that enables zooming without degrading the resolution, by including a fixed focus input image optical system. It discloses the function of altering the aspect ratio of the scene image by using an anamorphic fiber optic taper to apply to solid-state image sensor that uses linear image compression (C2,L55-62) and does not have any electronic zoom function that is realized by the non-linearly compressed input image. And these functions are entirely different from that of the electronic zooming of the present invention.

About the image device and the control system

As the uniform pixel density image device is the most popular image device, it is always desirable to apply it as the image sensor device.

The present invention made it possible to apply this conventional uniform pixel density image device to the electronic zooming system, by realizing the compressing optical system that composes a rectangular input image as the compressed zoom input image. (See Fig.1 and Fig.5).

On the other hand, Hoagland applied it to the image sensor device, by using an anamorphic fiber optic taper that linearly conforms the aspect ratio to it. Accordingly, it is used to different purpose and method each other.

And, the image correction and control system of the present invention processes the signal to reproduce many kinds of out-put zoom images of wide or telephoto angle from the compressed input image without degrading the resolution.

This function is entirely different from the Hoagland's processing system that simply compresses or expands the aspect ratio linearly to adjust the width or height of the out put image.

Claim 2 (amended to Claim 11) Hoagland inherently discloses the optical system (106) is included as an attachment optical system in that optical taper assemblies are not integrated parts of regular lens units. They must be attached to the lens units.

Generally, it is desirable to compose an optical system as a small attachment like widely used conversion attachment lenses. As the fixed focus non-linear compressing optical system can be realized as a simple single lens at this invention, it becomes possible to compose the optical system for electronic zooming as an attachment system at the present invention (P9,L20-21). But Hoagland applied a conventional anamorphic fiber optic taper as the attachment optical system for conforming the aspect ratio of scene image, and not for zooming function at all.

Accordingly, the purposes and methods to realize attachment optical systems of this invention are entirely different from that of Hoagland's disclosure.

Claim 3 (amended to Claim 9) Hoagland further discloses the compression of the circumferential part of the input image is limited to the vertical and horizontal direction (Col4, Lines 55-65; Col5, Lines 56-68; Col 6, Lines 1-32).

As is explained in preceding description, Hoagland does not disclose the compression of the circumferential part of the input image that compresses the input

image non-linearly and is needed for the electronic zooming of this invention (see Fig.1). But, it discloses the changing dimension of the scene image on the input face that compresses or expands the image linearly and does not realize the electronic zooming of this invention.

At the present invention, by limiting the non-linear compression of the circumferential part of the input image to vertical and horizontal direction, it became possible to use the conventional rectangular image sensor to this electronic zooming system. But, to change the aspect ratio in Hoagland's disclosure the compression is naturally limited only to vertical and horizontal directions.

And it is different from this invention.

Claim 4 (amended to Claim 10) Hoagland further discloses the image input device has a rectangular input plane (see Fig 3) and the optical system compresses the circumferential part of the input image to all directions, and the neighboring part of the vertical and horizontal axes of the input image (Col4, Lines55-65; Col5, Lines56-68; Col6, Lines1-32).

Hoagland's disclosure does not contain the optical system compresses the circumferential part of the input image to all directions. Hoagland compresses linearly only to vertical and/or horizontal directions. When the input image is compressed to all direction as the present invention, the compressed input image becomes a barrel shaped image with swelled part at the neighboring area of vertical and horizontal center axis of the image (see 4B of Fig.4)(P9,L52-55;P10,L1-13).

In the present invention, this swelled part of the barrel shaped image is compressed further more by preparing a compressing optical system that compresses further at the neighboring area of the vertical and horizontal center axes of the input image to realize the rectangular compressed input image.

So, the compression of input image of this invention for zooming is entirely different from Hoagland's disclosure that compresses linearly simply to vertical and horizontal directions to change the aspect ratio.

Conclusion (Item 8 of the detailed Office action)

8-1) Songer (5696560) discloses a motion picture distribution system improving horizontal and vertical detail.

Songer discloses a motion picture distribution system that compresses a wide-aspect ratio field of view horizontally into the NTSC aspect ratio by using the anamorphic lens. (Col5, L46-48)

Songer shows that the field is compressed linearly as conventional, but do not have any indication concerning to the electronic zooming of the present invention that needs the non-linear image compression.

As Songer's disclosure is entirely different from the present invention, the present invention cannot be anticipated by Songer. (Col8, L29-48)

8-2) Turmbull et al (5124840) discloses a portable viewing apparatus for use in either a three-dimensional image or a wide-angle image.

Turmbull discloses a viewing apparatus that expands (unsqueese) display images that are each horizontally compressed by a factor of two, to return to their original proportions. (Col2, L53-68; Col4, L22-26)

These are mere linear compression and expansion of images to change the aspect ratio, and do not have any description concerning to the electronic zooming function by non-linear image compression of the present invention. So, the present invention is entirely different from Turmbull, and cannot be anticipated by it.

8-3) Fukuoka et al (5673086) disclose an image aspect ratio conversion processing apparatus.

Fukuoka discloses a image aspect ratio compression processing apparatus that compresses a image optically from a original wide aspect image to a standard 4:3 image by the anamorphic lens with a predetermined compression rate, and displays a output image of original aspect ratio on a monitor by extending horizontally for the standard 4:3 image or by compressing vertically for the wide aspect image.

This disclosure is also an apparatus that simply changes the aspect ratio linearly, and do not have any description of the electronic zooming by non-linear image compression of the present invention. Accordingly, the present invention cannot be anticipated by the Fukuoka's disclosure.

8-4) Drewery et al (5956091) disclose a method of showing 16:9 pictures on 4:3 displays.

Drewery discloses a method of processing 16:9 pictures to display on a 4:3 screen with less obvious geometric distortion, by using cylindrical or stretched cylindrical processing that squeezes cylindrically in horizontal direction, and slightly stretches in vertical direction. (C2, L1-12) (C2,L19-28)

But it is a method how to distort a picture with less obvious geometric distortion to display the 16:9 picture on the 4:3 screen.

And Drewery's disclosure has no indication of the electronic zooming of the present invention that reproduce output zoom images of various image angles from the non-linearly compressed input image.

So, the present invention is different from Drewery's disclosure, and cannot be anticipated by it.

8-5) Teraoka et al (5537149) discloses a display device having a display screen of 4:3 aspect ratio for displaying fully a video image of 16:9 aspect ratio.

Teraoka discloses a 4:3 aspect ratio display device for displaying a video image of 16:9 aspect ratio without leaving a blank space, by the horizontal scale non-linearly compressed, and the vertical scale being non-linearly expanded.

It is intended to device the distortion of the changed aspect ratio image to keep less conspicuous. (Col11, L56-63)

Teraoka's disclosure that compresses the image signal in horizontal and expands conversely in vertical is intended to display the 16:9 image on the 4:3 screen while keeping the distortion of the image less conspicuous. And it is entirely different from the present invention that optically compresses non-linearly to both horizontal and vertical directions to realize electronic zooming.

Accordingly, the present invention cannot be anticipated by Teraoka.

8-6) Flory (4897722) discloses a wide screen enhanced definition television system compatible with an existing television standard.

Flory discloses a wide-screen enhanced definition television system that processes a wide-screen television signal of the wide-screen aspect ratio compressing horizontally to conventional 4:3 aspect ratio using an anamorphic lens instead of conventional lens.

And displays a wide-screen image that is expanded horizontally by using a wide-screen receiver.

Flory's disclosure that uses the anamorphic lens simply to change the aspect ratio is perfectly different from the present invention that realizes the electronic zooming by non-linear image compression.

And the present invention cannot be anticipated by Flory.

8-7) Suzuki (5668666) discloses a zoom lens with an anamorphic converter.

Suzuki discloses a zoom lens with an anamorphic converter that provide an freely attachable and detachable anamorphic converter lens group in the optical path in the

gap between lens groups that construct the zoom lens system.

Suzuki's disclosure is a zoom lens system that contains an anamorphic converter as a part of lens groups that constitute it, and is entirely different from the fixed focus compressing optical system of the present invention that does not use a conventional zoom lens.

Accordingly, the present invention cannot be anticipated by Suzuki.

The applicant received the office action about 2 months late, as it was mailed by ship, and offered a petition to reset a period for reply due to late reception of office action as the attached copy.

August 4, 2003

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Application Number: 09/331,008
Title: Electronic zoom image input method
Inventor: Eriko Shimizu
Art Unit: 2615

Details of abstract amendments

Abstract ~~Abstruct~~

An electronic zoom image input method that ~~which~~ enables zooming without declining the resolution by receiving an input image transmitted through a fixed focal distance optical system having a function of compressing the circumferential ~~circumferencial~~ part of the input image by means of a photo detector with a uniform pixel density and subjecting the received image to image correction and conversion ~~convertion~~ to obtain an output image.

It is necessary for zooming to use a conventional optical zoom lens that ~~which is essential but~~ essentially has a complex and large construction.

Instead, by using a simple fixed focal distance lens, a ~~zoom image input of~~ small, simple, all-electronic zoom image input system is realized.

Further, three-dimensional zooming, which conventionally requires precise interlock of two zoom lenses ~~lenzes~~, can be realized with a very simple construction without using these complicated ~~e~~ zoom lenses ~~lens~~.